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# Direction of Causality between Human Capital Investment and Economic Growth in Nigeria: Lesson For Policy Makers

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***Abstract***: *The study examined the direction of causality between human capital investment and economic growth in Nigeria from 1981 to 2017. Secondary data on economic growth, government capital and recurrent expenditures on health and education which was sourced from Central Bank of Nigeria statistical bulletin (CBN) various issues were subjected to econometrics tools in sequential order of stationary test (Dickey-Fuller Generalised Least Square), Cointegration and Granger Causality tests. The empirical findings revealed that all variables are stationary of the same order that is integrated of order one 1(1) which necessitated the employment of Johansen Cointegration test so as to determine the long-run relationship but it was observed through both trace statistic and the maximum Eigen statistic that there was no cointegrating or long-run relationship between economic growth and human capital investment. Besides, in terms of direction of causality, on aggregate, unidirectional causality is observed which runs from economic growth to total government expenditure on human capital investment. On the other hand, at disaggregate level, unidirectional causality was noticed from economic growth to total recurrent expenditure on human capital and capital expenditure on human capital to economic growth respectively. Finally, there is unidirectional causality between total recurrent expenditure on human capital and total capital expenditure on human capital which runs from total capital expenditure on human capital to total recurrent expenditure on human capital. The study concluded that economic growth is expected to play a crucial role towards investment in human capital segment; that is, health and education, while policy recommendations comprised enforcement of due process during formulation and implementation of fiscal policy most especially expansionary fiscal policy towards health and education sectors, and policy aimed at not only reducing/eliminating human capital flight but also restricting receiving medical treatment abroad are put forward.*

**Keywords-** Human Capital, Economic Growth, Policy Makers, Granger Causality

## 1. INTRODUCTION

Human capital, according to Organisation for Economic Co-operation and Development (OECD, 2001), is defined as the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being. This incorporates various skills and competencies that are acquired through learning and experience, but may also include innate abilities. Human capital refers to education, health, on-job training and the skills acquired through interaction of people or societies. In more technical term, human capital is the aggregation of the innate abilities and the knowledge and skills that individuals acquire and develop throughout their lifetime.

However, various economic and non-economic benefits seem to be associated with human capital development which include improvement in firm performance with respect to financial and productivity level (Marimuthu, Arokiasamy, and Ismail, 2009; Rahim, Atan, and Kamaluddin, 2017; Khana, and Quaddus 2018), reducing income inequality (Lee and Lee 2018; Gilberto, Laura and Gustavo, 2018) social return like political participation (Peter *et al* 2016) inclusive growth that is a reliable tool for the attainment of sustainable development (Oludumila, Akinyemi, and Adediran, 2018) and health (Wang, and Liu, 2016) among others.

David, Michael and Klaus, (2018) buttressed that investments in human capital most especially health component would lead to rising longevity, which may in turn stimulate higher labour force participation and workforce productivity. In terms of age structure and gender role, children's health may affect their education and has long-lasting implications on participation in productive activities, women's health is associated with substantial intergenerational spill over or externality effects and influences women's empowerment and health at older ages has implications for retirement and care which may sum up to impact growth either positively or negatively.

Friday, Fidelis, Udeme and Olumide (2016) corroborated that human capital has potential to promote economic growth in right direction as compared with other sector like Agriculture, regardless of the fact that Agriculture is a major provider of livelihood opportunities. Considering the level of economic growth measured by GDP, Barro, (2001) concurred that higher initial stock of human capital tends to generate higher growth through the following channels, as more human capital facilitates the absorption of superior technologies from advanced economies and tends to be more difficult to adjust than physical capital. It was concluded that a country that starts with a high ratio of human to physical capital (such as in the aftermath of a war that destroys primarily physical capital) tends to grow rapidly by adjusting upward the quantity of physical capital.

The studies on the causal relationship between human capital and economic growth revealed mixed and inconclusive outcomes. Jeffrey (2018) found a unidirectional causality running from human capital (education expenditure) to economic growth in Cˆote d'Ivoire. In contrary, Zerihun, (2014) reported

unidirectional causality which runs from economic growth to human capital (health provision) and feedback causality between the two measures of human capital, that is, education and health provision in Ethiopia. Uche Ihugba and Nwosu (2013) submitted that the granger causality runs from economic growth to human capital (that is expenditure on education) with no reserve causality in Nigeria. In another development, Abhijeet (2010) reported bi-directional causality between human capital (education expenditure) and economic growth, such that the causality runs from economic growth to education expenditure and vice versa in India.

Disaggregating human capital expenditure into capital and recurrent components in Nigeria, Oriakhi and Ameh (2014) found a unidirectional causality between capital expenditure on education and literacy rate, bidirectional causality between recurrent and capital expenditure on education. Besides, no causality between economic growth and recurrent expenditure on education while bidirectional causality was reported between growth and capital expenditure on education. Nurhanani, Mohamad and Hamid, (2014) confirmed long run relationships among government expenditure in education and health and economic growth in Malaysia.

Zahari and Sudirman (2017) confirmed that rise in government spending on education leads to decline in the index of human development, while increase in government's expenditure on health stimulates substantial improvement in human development index in Indonesia. Also, access to quality healthcare and prevention services is crucial in alleviating poverty and fostering economic growth. This is because, healthy people can plan for security, development or economic advancement. Abada and Ugwunta (2016) reported positive but insignificant influence of public budgetary allocations to the health sector on life expectancy in Nigeria.

Therefore, it seems that the inconsistence in terms of direction of causality between economic growth and human capital may be attributed to prevailing institutional environment and principles governing the allocation of resources, such that an increase in income may lead to an increase in human capital investment. For instance, at the family level, an increase in income may be used in enhancing human capital provided the additional income is used not only to educate but also to improve health status of the family members. Similarly, at the government level, ceteris paribus, an increase in income may be channelled to bring about advancement in education and health expenditure respectively.

## 2. STATEMENT OF THE PROBLEM

In Nigeria, there have been fluctuations in the budgetary allocation to human capital investment by the government for the past few decades at both aggregate and disaggregate levels. The trend of government expenditure on education according to Nigeria Year Book (1968) cited in Adeyemi (2011) gives a clear picture such that out of £143.1million and £69.2 million earmarked for total recurrent and capital expenditures in 1964, £25.3 million and £4.2 million which represent 17.7 and 6.1 per cent was meant and spent on education respectively.

In 1965, allocation to total recurrent expenditure surged to £162.1 million with £27.5 million allocated to recurrent segment of education expenditure which amounted to 17.0 per cent, while capital expenditure was allotted £70.4 million out of which £5.1 million which accounted for 7.2 per cent was given to capital expenditure on education. Besides, in 1966, there was an increase in total recurrent expenditure to £174.8 million with resultant rise in recurrent expenditure on education to £32.8 million which amounted to 18.8 percent. While total capital expenditure stood at £70.4 million during this period, capital expenditure on education declined to £5.0 million which represented 7.0 per cent. Similarly, on aggregate, 13.0, 10.8, and 11.5 per cent of the annual federal budgetary allocation was allotted to education in 1995, 1996 and 1997 respectively. It declined to 9.6 per cent and 8.7 percent in 1998 and 2000.

The trend in the recent past was no exception. In 2009, the Federal Government allocated N221.19 billion (7.25 per cent) of its N3.049 trillion budget to education. The figure reduced to 4.83 per cent in 2010 when education got N249.09 billion of the hefty N5.16 trillion appropriation. There was a marginal improvement in 2011 when education got N306.3 billion (6.16 per cent) of the N4.972 trillion budget. The marginal improvements continued in 2012 (8.20 per cent), 2013 (8.55 per cent), and 2014 (9.94 per cent) until 2015 (7.74 per cent) when a significant drop in allocation to education was recorded. In 2016, out of the N6.061 trillion budget, only N369.6 billion (6.10 per cent) was appropriated for education. There was a slight rise in 2017 (7.38 per cent) but the figure declined to 7.03 per cent in 2018 when education got N605.8 billion of the huge N8.612 trillion appropriation. It is clear to deduce that Nigeria government had never once met minimum percentage (that is 26 per cent of the total annual budget allocation) to be given to education sector as reiterated by UNESCO.

In another development, Heads of States of African Union member countries met and pledged to set a target of at least 15 per cent of their annual budget to improve the health sector as reflected in Abuja Declaration document/communique drafted in April 2001. According to World Health Organization (WHO), only Rwanda and South Africa had met the target. Nigeria has not attained the pledged funding benchmark as the Federal Government has never voted more than 6 per cent of the annual budget to the health sector. In addition, World Health Organization (WHO) said that out of 191 countries, Nigeria is rated and ranked 187$^{th}$ position in terms of health care delivery and that one-third of more than 700 health facilities have been destroyed in the country and about 3.7 million people are in need of health assistance. It is against this background that the study intends to examine the direction of causality between human capital investment (education and health investment) and economic growth in Nigeria with data spanning from 1981 to 2017 at both aggregate and disaggregate phases.

## 3. REVIEW OF LITERATURE

Jeffrey (2018) investigated the relationship between education expenditure and economic growth for Côte d'Ivoire for the period from 1970 to 2015. The study applied bounds testing approach, estimated an ARDL model and used the Toda and Yamamoto (1995) Causality Test. The study provides evidence of the existence of a negative and significant long term effect of government education expenditure on economic growth for the aforementioned period. Moreover, there is a non-significant positive effect of government education expenditure on economic growth in the short term. The results show a unidirectional causality relationship between the two variables, running from education expenditure to economic growth.

Komain (2007) evaluated the relationship between government expenditures and economic growth in Thailand. The results showed that aggregate government expenditures cause economic growth, but economic growth did not cause government expenditures to expand. In other words, there was a unidirectional causality between government expenditures and economic growth in Thailand. Further investigation using the ordinary least square method indicated that government spending and its one-period lag variable impose a highly significant impact on economic growth which confirms the results from causality test.

Oriakhi and Ameh (2014) assessed the influence of government expenditure on the education sector in Nigeria between 1980 and 2011. The co-integration results indicate that there was a long-run relationship between the variables and they are statistically significant. The Granger Causality test shows that the various variables granger causes literacy rate in Nigeria. And that there was unidirectional causality between capital expenditure on education and literacy rate, bidirectional causality between recurrent and capital expenditure on education. Besides, no causality between economic growth and recurrent expenditure on education while bidirectional causality was reported between growth and capital expenditure on education.

The impact of human capital on economic growth for selected 32 developing countries was investigated by Altiner, and Toktas, (2017) using panel data analysis method data spanned from 2000-2014. According to empirical analysis results, it was revealed that human capital positively affects economic growth. It has also been found that its positive effect on economic growth has reduced while the education level has increased. On the other hand, the results of the analysis indicate that physical capital has a positive impact and that the labour negatively affects economic growth in the studied countries. They concluded that economic growth is not only dependent on physical capital but also on human capital.

Khan, Naeem, and Khan, (2015) examined the role of human capital in economic growth of Pakistan during the period 1971-2012.Granger Causality test was used as analytical technique. The study used research and development (R&D), education and health as proxies for human capital. The results confirmed the role of human capital in the economic growth of the study area. The results show that human capital in form of Research and Development (R&D) Granger caused economic growth during the study period. Moreover, unidirectional causal relationships exist among different levels of education, physical capital, R&D and economic growth.

Ubi-Abai, and George-Anokwuru, (2018) empirically examined the determinants of human capital formation with evidence from the Nigerian data using three-stage least squares. They reported that health expenditures had a bi-directional positive and significant relationship with growth. Mortality rate experienced negative growth rates and empirically had a positive relationship with expenditures on health. Education expenditures had a bi-directional negative and significant relationship with growth despite the fact that the education sector experienced growth in spending over the years. Primary enrolment experienced negative growth. However, secondary and tertiary enrolments experienced positive growth rates in Nigeria.

Bouhari and Soussi (2017) examined the direction of relationship between economic growth, education and investment. They used an econometric panel data approach for five MENA countries over the period of 1975-2014. Granger causality within the framework of a panel model was utilised. The empirical results indicated that there was strong causality running from education and investment to economic growth with no feedback effects from economic growth to education and investment. The results showed a presence of short-run bi-directional causality between investment and education. This implies that education and investment are interconnected in short-run, which also supports the feedback hypothesis indicating that the investment drives the education in mentioned countries and vice versa. In addition, the investment has contributed to education and economic growth during the sample period.

Adekoya, (2018) examined the impact of human capital development on poverty alleviation in Nigeria from 1995-2017. The study used Granger causality test through a vector Error Correction Mechanism (VECM). The result indicated that there is no causality either uni-directional or bi-directional between government expenditure on education and health, infant mortality, gross enrolment ratio and per capita income but cases of uni-directional causality existed for literacy rate, life expectancy, and per capita income.

Kotásková, et al (2018) attempted to evaluate the relationship between education and economic growth in India from 1975 to 2016 by focusing on primary, secondary and tertiary levels of education. The relationships are examined by utilization of econometric estimations with the Granger Causality Method and the Cointegration Method. The findings revealed that a positive connection between education levels and economic growth such that tertiary education is the main causal force in the economic growth in India but mainly for male population.

Kubalu, Mustapha, and Suwaid, (2017) attempted to investigate the role of human development in terms of education and health on economic growth in Nigeria using annual data during the period 1995-2015. ADF, PP and Ng-Perron unit root tests are utilized to check the stochastic properties of the variables or otherwise. The unit root results reveal that the variables in the study are a mixture of 1(0) and 1(1), which necessitate the use of the ARDL model to analyse the relationship. The paper relies on the ARDL-ECM bounds testing approach to cointegration and granger causality to ascertain the long run relationship as well as speed of adjustment and direction of causality among the variables. Findings revealed the existence of a long run relationship between human development and economic growth in Nigeria and that education index and health index as measures of human capital development are found to have a short run and long run negative impact on the economic growth over the period. Also, the estimated models performed well as the speed of adjustment is quite fast for the expected negative sign. This is further confirmed by the results of Granger causality test which indicated the existence of unidirectional causality running from health index to economic growth, whereas no causal relationship exists between education index and economic growth. Awel, (2013) reported a bidirectional causality running from human capital to output per worker and vice versa.

Ali, Siddique, Ullah, and Mahmood, (2018) examined the role of foreign aid in enhancing the quality of human capital in Pakistan for 1980-2016 using Johansen co-integration and granger causality approaches. The findings of Johansen co-integration express the long run nexus between human capital, foreign aid, economic growth, and human development index. The empirical results exposed one way causality from human capital and economic growth to foreign aid and the existence of two-way causal relationship among human capital and HDI.

## 4. METHODOLOGY

The study employed different tools of econometrics which was in tandem with the focus of the research work. These involved unit root test, cointegration and causality tests. The reason behind unit root test was to ascertain the status of the series once the variables are stationary at first difference. The series were subjected to cointegration test in order to establish the number of cointegrating equations coupled with long-run relationship between the variables. This is because, using Ordinary Least Square (OLS) technique without establishing the stationary status of the series might make the result of the regression to be spurious which gave room for wrong conclusion and misleading policy recommendation from the analysis. Besides, Granger causality test was used to determine the direction of causality between the variables at both aggregate and disaggregate phases.

## 5. DATA DESCRIPTION

Four variables were employed in the analysis for both aggregate and disaggregate levels. Hence, the definition, measurement, sources and period as used in the study are depicted in the table 1 below:

**Table 1: Definitions, Sources and Measurements of Variables**

| Variable | Measurement | Sources | Period |
|---|---|---|---|
| Gross Domestic Product (GDP) | GDP used as the proxy for economic growth in Nigeria | Central Bank of Nigeria (CBN) statistical bulletin various issues | Annual data from year 1981 to 2017 |
| Total Government Expenditure on Education and Health (THCE) | THCE used as the proxy for total human capital investment in Nigeria | | |
| Total Government Recurrent Expenditure on Health and Education (TREH) | TREH used as the proxy for recurrent component of human capital investment in Nigeria | | |
| Total Government Capital Expenditure on Health and Education (TCEH) | TCEH used as the proxy for capital component of human capital investment in Nigeria | | |

## 6. MODEL SPECIFICATION

The relationship between economic growth and human capital investment in both aggregate and disaggregate levels are given in functional and econometrics formats as thus:

$GDP = f(THCE)$ ---------- (1)

$GDP = f(TREH, TCEH)$ ---------- (2)

$GDP = \beta_0 + \beta_1 THCE + U_i$ ----------(3)

$GDP = \alpha_0 + \alpha_1 TREH + \alpha_2 TCEH + U_t$ ------ (4)

However, the variables are defined as Gross Domestic Product (GDP), Total Government Expenditure on Education and Health (THCE), Total Government Recurrent Expenditure on Health and Education (TREH), and Total Government Capital Expenditure on Health and Education (TCEH) as indicated in the table above.

## 7. GRANGER CAUSALITY MODEL SPECIFICATION

Causality in econometrics according to Dimitrios and Stephen (2007) is somewhat different to the concept in everyday use; it refers to the ability of one variable to predict (and therefore cause) the other. As a result, Granger (1969) developed a relative simple test that defined causality as follows; a variable $y_t$ is said to Granger cause $x_t$ , if $x_t$ can be predicted with greater accuracy by using past values of the $y_t$ variable rather than not using past values, all other terms remaining unchanged. The Granger causality test for the case of two

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stationary variables $y_t$ and $x_t$, involves, as a first step, the estimation of the following VAR model:

$Y_t = \alpha_1 + \sum_{i=1}^{n} \beta i\, Xt - 1 + \sum_{j=1}^{m} \varphi i\, Yt - j + e_{it}$ ----(5)

$X_t = \alpha_2 + \sum_{i=1}^{n} \beta j\, Xt - 1 + \sum_{j=1}^{m} \varphi j\, Yt - j + e_{2t}$ ---(6)

Where it is assumed that both $e_{it}$ and $e_{2t}$ are uncorrelated white-noise error terms. In this model we can have the four different cases;

**Case 1:** The lagged x term in equation (5) may be statistically different from zero as a group and the lagged y terms in equation (6) not statistically different from zero. In this case we have unidirectional causality which runs from $x_t$ to $y_t$.

**Case 2:** The lagged y term in equation (6) may be statistically different from zero as a group and the lagged x terms in equation (5) not statistically different from zero. In this case, we have unidirectional causality which runs from $y_t$ to $x_t$.

**Case 3:** Both sets x and y terms are statistically different from zero in equations (5) and (6) so that we have bi-directional causality.

**Case 4:** Both sets x and y terms are not statistically different from zero in equations (5) and (6) so that $x_t$ is independent of $y_t$.

## 8. Empirical Analysis

### Unit Root Test Result

There are important differences between stationary and non-stationary time series. In stationary time series, shocks will be temporary and over time their effect will be eliminated as the series revert to their long run mean values. On the other hand, non-stationary time series will necessarily contain permanent components. Therefore, the mean and/or the variance of a non-stationary time series will depend on time which leads to cases where a series has no long-run means to which the series returns and the variance will depend on time and will approach infinity as time goes to infinity (Dimitrios and Hall, 2007). Hence, the Dickey-fuller Generalised Least Square (DF-GLS) test proposed by Elliot, Rothenberg and Stock (ERS, 1996) was employed to test for the presence or otherwise of the unit roots in the series. This test according to Faiz and Tahir (2011) is similar to an Augmented Dickey Fuller test, but it has the best overall performance in terms of the small sample size.

**Table 2: DF- GLS Unit Root Tests**

| Variable | Level | 1st Diff. | 1% | 5% | 10% | Decision | Order of Integration |
|---|---|---|---|---|---|---|---|
| THCE | 1.17 | -6.05 | -2.63 | -1.95 | -1.61 | Stationary at 1st difference | 1(1) |
| TCEH | -0.80 | -6.36 | -2.63 | -1.95 | -1.61 | Stationary at 1st difference | 1(1) |
| GDP | 0.74 | -6.12 | -2.63 | -1.95 | -1.61 | Stationary at 1st difference | 1(1) |
| TREH | 0.76 | -6.41 | -2.63 | -1.95 | -1.61 | Stationary at 1st difference | 1(1) |

Source: Author Computation (2019) with the aid of Eviews 6.

The Dickey-fuller Generalised Least Square (DF-GLS) unit root test results reveal that all the series or variables employed that is gross domestic product (GDP), total expenditure on human capital investment (THCE), total capital expenditure on human capital investment (TCEH) and total recurrent expenditure on human capital investment (TREH) were not stationary at levels but stationary at first difference.

**Table 3: Johansen Cointegration Test Result**

| Cointegration at Aggregate Level | | | | | |
|---|---|---|---|---|---|
| Hypothesis | Variables | Max-Eigen Statistic | Critical Value (5%) | Trace Statistic | Critical Value (5%) |
| Gross Domestic Product and Total Expenditure on Human Capital | | | | | |
| $H_0$ | r = 0 | 12.98152 | 14.26460 | 14.82900 | 15.49471 |
| $H_a$ | r ≤ 1 | 2.847477 | 3.841466 | 2.847477 | 3.841466 |
| Cointegration at Disaggregate Levels | | | | | |
| Gross Domestic Product and Recurrent Expenditure on Human Capital | | | | | |
| Hypothesis | Variables | Max-Eigen Statistic | Critical Value (5%) | Trace Statistic | Critical Value (5%) |
| $H_0$ | r = 0 | 11.36278 | 14.26460 | 13.41491 | 15.49471 |
| $H_a$ | r ≤ 1 | 0.052125 | 3.841466 | 0.052125 | 3.841466 |
| | | | | | |
| Gross Domestic Product and Capital Expenditure on Human Capital | | | | | |
| Hypothesis | Variables | Max-Eigen Statistic | Critical Value (5%) | Trace Statistic | Critical Value (5%) |
| $H_0$ | r = 0 | 10.68072 | 14.26460 | 13.17257 | 15.49471 |
| $H_a$ | r ≤ 1 | 1.491855 | 3.841466 | 1.491855 | 3.841466 |

Source: Author Computation (2019) with the aid of Eviews 6.

Having established with aid of Dickey-Fuller Generalised Least Square (DF-GLS) test postulated by Elliot, Rothenberg and Stock (ERS, 1996) that all the series were integrated of the same order, that is, integrated of order

one 1(1). Johansen Cointegration test was used to check for long-run tendencies between economic growth and human capital investment both in aggregate and disaggregate levels by adopting both trace statistic and the maximum Eigen statistic to identify the number of cointegrating vectors. The outcomes reveal that there was no cointegrating or long-run relationship between economic growth and human capital investment. This is because the trace statistic values and Max-Eigen Statistic values are less than critical values at 5% level of significant at both aggregate and disaggregate levels. It is clear to infer that the two tests are in solid agreements to one another and that null hypothesis which states that there was no cointegrating equation is upheld.

**Table 4: Pairwise Granger Causality Tests Result**

Pairwise Granger Causality Tests
Date: 01/14/19 Time: 18:15
Sample: 1981 2017
Lags: 2

| Null Hypothesis: | Observations | F-Statistic | Prob. |
|---|---|---|---|
| THCE does not Granger Cause GDP | 35 | 0.00318 | 0.9968 |
| GDP does not Granger Cause THCE | | 22.6305 | 1.E-06 |
| Disaggregate Levels: GDP and TREH | | | |
| Null Hypothesis: | Observations | F-Statistic | Prob. |
| TREH does not Granger Cause GDP | 35 | 0.84666 | 0.4388 |
| GDP does not Granger Cause TREH | | 26.9960 | 2.E-07 |
| GDP and TCEH | | | |
| Null Hypothesis: | Observations | F-Statistic | Prob. |
| TCEH does not Granger Cause GDP | 35 | 3.53627 | 0.0418 |
| GDP does not Granger Cause TCEH | | 1.68499 | 0.2025 |
| TCEH and TREH | | | |
| Null Hypothesis: | Observations | F-Statistic | Prob. |
| TREH does not Granger Cause TCEH | 35 | 1.14452 | 0.3319 |
| TCEH does not Granger Cause TREH | | 3.51852 | 0.0424 |

**Direction of Causality**

GDP → THCE Unidirectional Causality
GDP → TREH Unidirectional Causality
TCEH → GDP Unidirectional Causality
TCEH → TREH Unidirectional Causality

According to the results obtained from the Pairwise Granger causality test, at the aggregate level, unidirectional causality was observed which runs from economic growth to total government expenditure on human capital investment as reflected in the legend above. On the other hand, at disaggregate level, unidirectional causality was noticed from economic growth to total recurrent expenditure on human capital and capital expenditure on human capital to economic growth respectively. Finally, there was unidirectional causality between total recurrent expenditure on human capital and total capital expenditure on human capital which runs from total capital expenditure on human capital to total recurrent expenditure on human capital.

## 9. Discussion of Findings

The series are subjected to stationarity test using Dickey-Fuller Generalised Least Square (DF-GLS) test technique proposed by Elliot, Rothenberg and Stock (ERS, 1996). The outcomes from the technique revealed that all the variables used in the research work are stationary at first difference at 1%, 5% and 10% significant levels respectively. As a result of the fact that the variables are integrated of the same order that is 1(1), Johansen Cointegration test was conducted to check for long-run tendencies between economic growth and human capital investment both in aggregate and disaggregate levels. However, the outcomes from both trace statistic and the maximum Eigen statistic indicated that there was no cointegrating equation or long-run relationship between economic growth and human capital investment. This is because the trace statistic values and Max-Eigen Statistic values are less than critical values at 5% level of significance at both aggregate and disaggregate levels which was in support of research work conducted by Komain (2007) in which no cointegration between government expenditures and economic growth in Thailand was reported. On the basis of the outcomes that originated from pairwise Granger causality test, on aggregate, there was unidirectional causality between human capital and economic growth which emanates from growth to total expenditure on human capital (education and health). At disaggregate stage, uni-directional causality from economic growth to total recurrent expenditure on human capital was noticed. This is in consonance with the submission made by Zerihun, (2014) in which unidirectional causality was reported which runs from economic growth to human capital. Furthermore, total capital expenditure on human capital Granger causes growth and at the same time Granger causes total recurrent expenditure on human capital in a unidirectional format.

This is in supportive of research outcome conducted by Jeffrey (2018) in which a unidirectional causality running from human capital to economic growth was found. In conclusion, economic growth has predictive power on aggregate investment on human capital (education and health). Besides, disaggregate component of human capital investment that is total capital expenditure on human capital exhibited a predictive influence on economic growth while total capital expenditure on human capital Granger causes total recurrent expenditure on human capital.

## 10. Policy Recommendations

In the light of this, the following recommendations were suggested for the policy makers;

i. On the basis of the general belief that health is wealth, the government, through fiscal policy, should increase both capital and recurrent expenditure on health segment. As rise in capital expenditure would go a long way in providing a good health environment, build health facilities, and equipped health centres with modern devices while increase in recurrent expenditure would lead to positive change in the rate of doctor to patients, bring about health workers motivation and increased remuneration, amongst others. This would in turn influence economic growth in different dimensions such as increased productivity, minimise or eliminate truancy among workers or learners due to illness, improve personal hygiene, etc.

ii. The government should put a policy in place which aimed at restricting well-meaning Nigerians, political functionaries inclusive from getting medical treatment overseas as well as other machinery to combat or address human capital flight among potential and existing human capital, most especially medical personnel by providing conducive working environment and access to research and development facilities as done in advanced economies.

iii. The government should also increase both capital and recurrent expenditure on education, as this would enhance the standard of living of the people through their access to quality and standard education. As a result, an increased investment in education will assist in attaining and achieving skillful entrepreneurs among graduates and thereby reducing their searching for and reliance on white collar jobs. In the light of this, formal curriculum should be designed in such a way as to accommodate both theoretical and practical components simultaneously in order to guarantee employability of the graduates.

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